

Chromaticity jump test at injection

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Outline of the experiment

- Changing the γ_t -quad polarity at injection results in a chromaticity jump
- The jump can be controlled by setting the sextupoles (four families per arc) differently
- This works beautifully in the model
- Does the actual machine match the model?

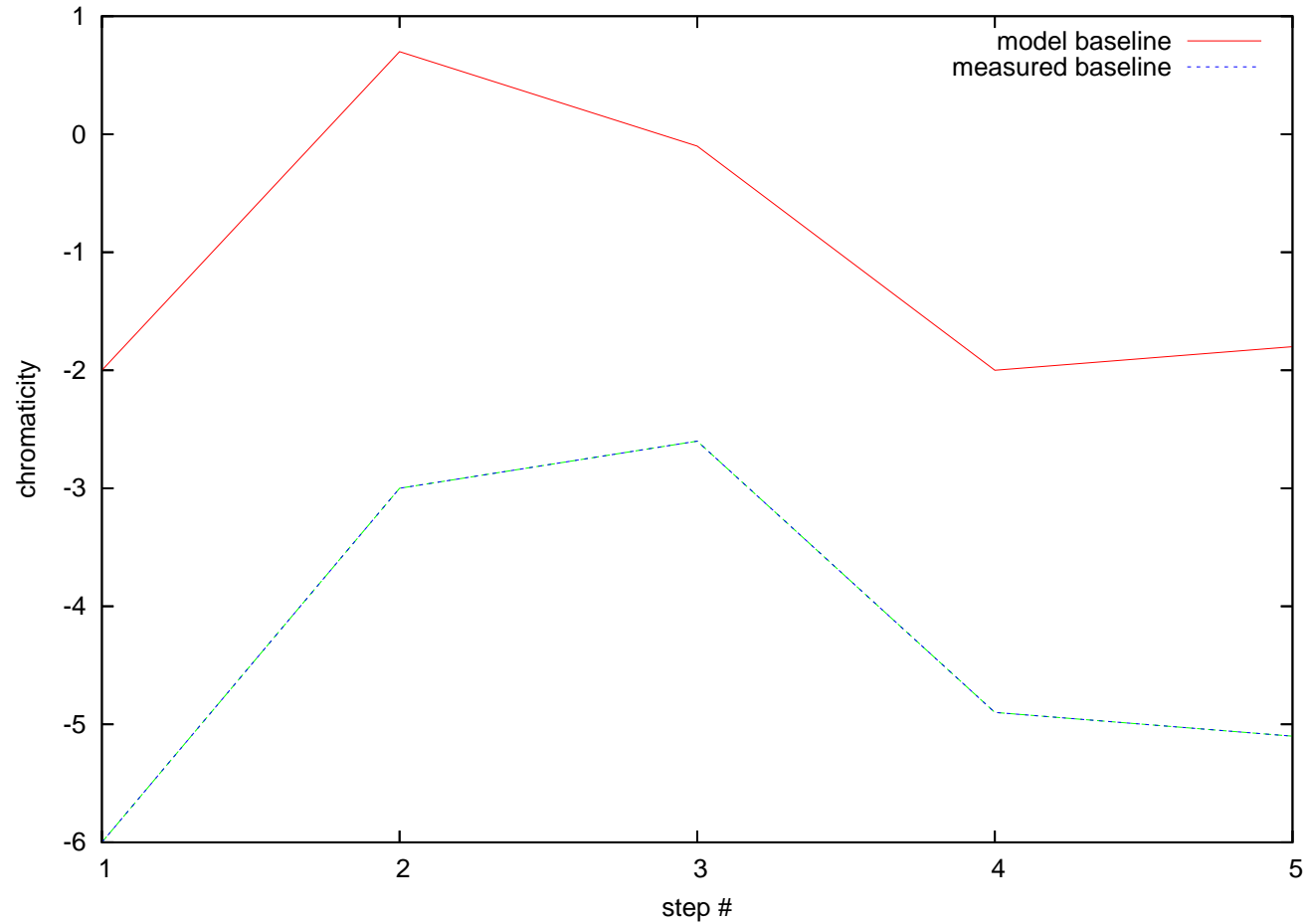
→ Observe chromaticities in model and machine simultaneously

Five steps:

1. Regular sextupole settings, γ_t -quads in “+” polarity
2. Regular sextupole settings, γ_t -quads in “-” polarity
3. Modified sextupole settings, γ_t -quads in “-” polarity
4. Modified sextupole settings, γ_t -quads in “+” polarity
5. Regular sextupole settings, γ_t -quads in “+” polarity
(=Step 1)

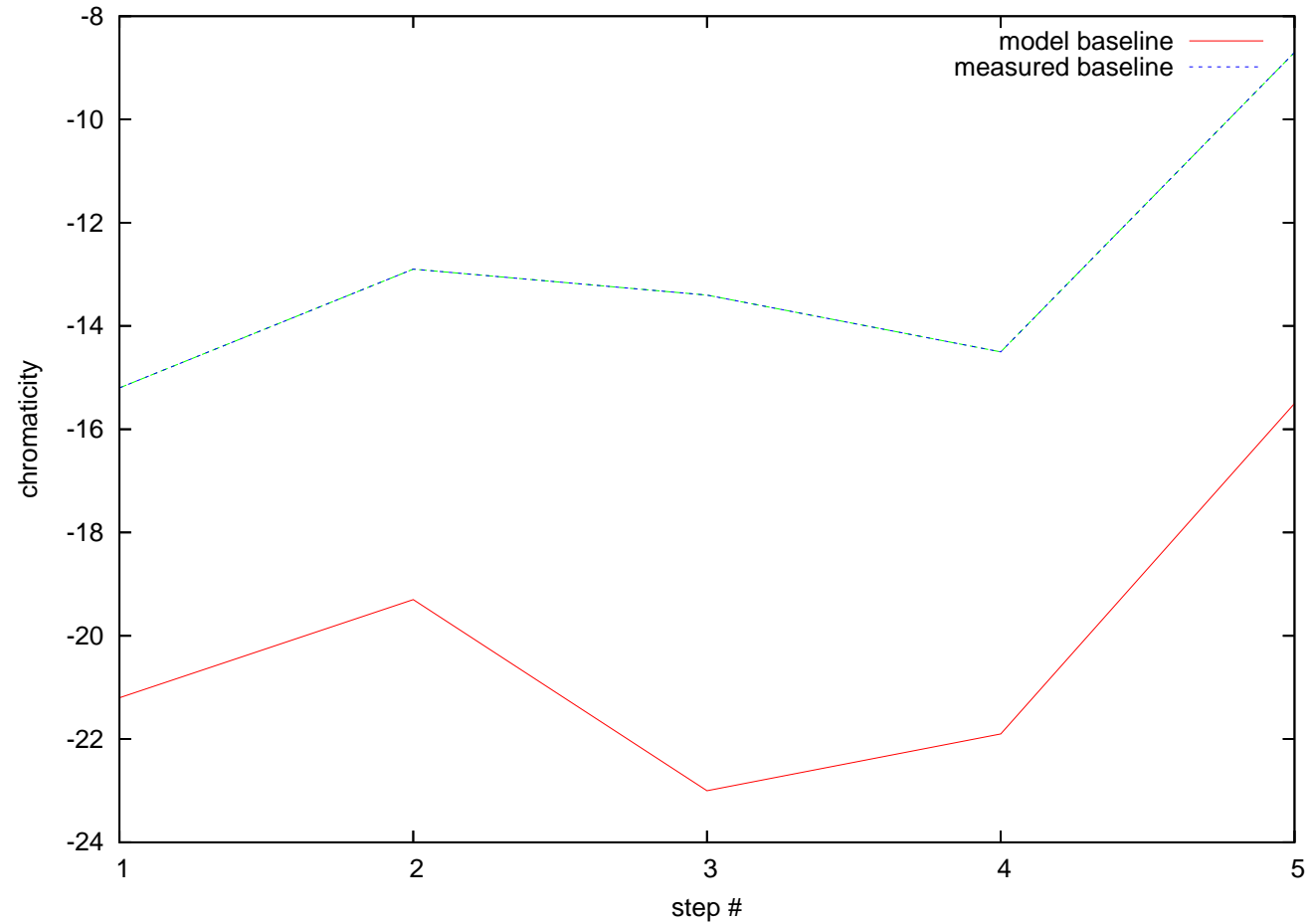
Note: Step 3 to 4 corresponds to a “backwards” chromaticity jump

Vertical chromaticity during the experiment



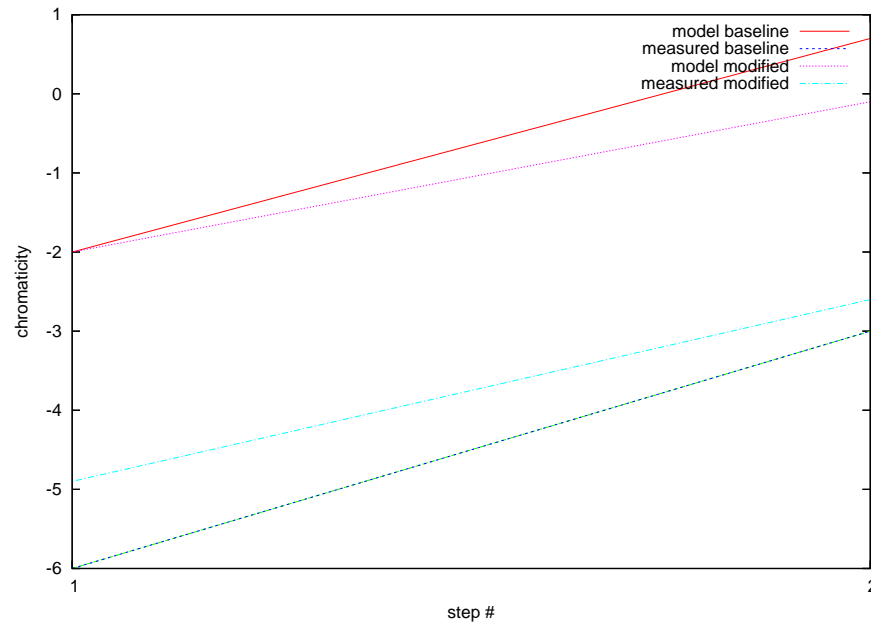
→ Nice agreement between measurements and model

Horizontal chromaticity during the experiment



→ Clear discrepancy for Step 3

Vertical chromaticity jump

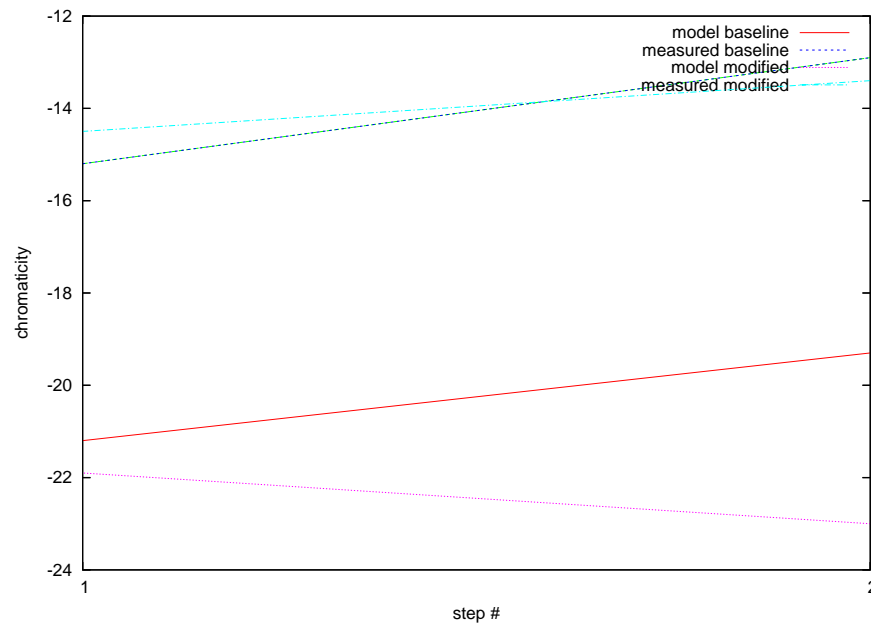


Model: vertical chromaticity jump gets reduced by 0.8 units

Measurement: vertical chromaticity jump gets 0.7 units smaller with modified sextupoles

→ “perfect” agreement!

Horizontal chromaticity jump



Model: horizontal chromaticity jump gets 3.0 units smaller
Measurement: horizontal chromaticity jump gets 1.4 units smaller with modified sextupoles
→ factor 2 discrepancy